

Traditional orchards: a summary

This note provides a summary of the key information contained in the series of Natural England Technical Information Notes on traditional orchards. These provide guidance on site and tree selection, planting and establishing fruit trees, general pruning, formative pruning, maintenance pruning, the restoration of neglected orchards, tree health and wildlife. The term 'traditional orchard' generally refers to groups of standard and half-standard trees grown on vigorous rootstocks planted at low densities on permanent grassland. Widely distributed across England, they include apple, pear, cherry, plum and damson orchards, and cobnut plats. For an explanation of terms used in this leaflet see the information note *Orchard glossary*.

Site and tree selection

Site selection

In the past, many farmhouses had an orchard nearby providing fruit for the family, while in areas like the West Midlands and Kent there were larger, commercial orchards. Today, while the management and restoration of existing orchards takes priority, the creation of new orchards is valuable for wildlife and can restore or reinforce landscape character. Any new orchard should be sited so that it has a positive impact on the landscape and is suitable for growing fruit. Ideally, new orchards should be planted on old orchard sites, but not on sites that are of archaeological interest.

It is important to establish fruit trees properly, whether planting a new orchard or replacing trees in an existing one. Fruit can be grown in most situations, but the ideal site is in a sunny, sheltered, south-west facing location, away from frost pockets such as valley bottoms.

Tree selection

Tree size Maidens are generally cheaper and establish better than standards. However, standards have the advantage of already having had some formative pruning.

Rootstocks Dwarfing rootstocks have been developed to produce smaller trees, often planted in bush-tree orchards and gardens. However, traditional orchard trees need to be

grown on vigorous rootstocks to support a tall trunk and to raise the larger branches above the reach of grazing animals.

Varieties There is a huge choice of fruit tree varieties, particularly apples. Many varieties are old and confined to a small area, even to a single village. Many more are either rare or have become extinct. Species and varieties may be chosen for a number of reasons, such as their cultural and historical value, their suitability for local conditions, or the uses to which the fruit is to be put (ie eating, cooking or juicing).

Planting and establishing fruit trees

Pre-planting

Correct planting and aftercare is crucial to a tree's long-term survival. If not carried out correctly the tree may struggle or die, no matter how good the aftercare.

Pattern and density

In an existing orchard, new trees should fit in with the planting pattern. However, it may be necessary to plant to one side of the original planting hole to reduce the risk of disease. Planting densities depend on the tree species: apples are generally planted 8-10 metres apart, pears and cherries further apart still, while plums can be planted more densely.

Traditional orchards: a summary

Time of year

Bare-rooted trees should be planted from November to March, when they are not in leaf. The roots need to be kept cool and moist before planting. Container trees can be planted throughout the year, but if planted in the summer they will need a lot more watering. Planting should not be carried out during periods of frost.

Planting the tree

First, clear the vegetation in a one-metre circle where the tree will be planted. Where the soil structure is good, maidens can be notch-planted. For larger trees, and where soil structure needs to be improved, dig a hole that will accommodate the roots without them bending. Keep the topsoil and subsoil separate. Drive a short stake into the hole, leaving no more than 30 cm above ground level. This will allow the tree to flex and strengthen the trunk and roots. Next, put in the tree and carefully backfill the soil around the roots, ensuring that the final soil level is at the root collar. It should not be necessary to apply fertiliser or organic matter. The tree should be watered regularly and thoroughly for the first few weeks and during any dry spells for the next year.

Guards

Guards will be required to protect trees from grazing livestock and wild animals, which eat the leaves and bark, and rub against the tree. Guards must be checked regularly as the trees grow, and adjusted if they are causing the tree any damage.

Weed control

Competition for water and nutrients can severely affect trees, particularly when young. Therefore, a one metre circle around the tree should be kept clear of grass and weeds for at least the first three years after planting. Preferably this is done by applying a thick mulch.

An introduction to pruning

Introduction

Pruning is an essential part of successful fruit growing. It helps to develop and maintain a balanced tree, stimulates strong growth, new fruit-bearing branches and a regular crop of healthy fruit. Pruning is also an opportunity to remove dead wood and helps keep a tree to a

manageable size and an even shape once it has matured.

Equipment

Five tools are useful for pruning:

- bow saws for large branches;
- pruning saws for medium branches;
- loppers for smaller stems;
- secateurs for twigs and shoots; and
- a pruning knife for young growth and tidying up larger cuts.

Keep all tools sharp, use the right tool for the job and disinfect tools after use.

How to make pruning cuts

Small cuts When cutting stems with secateurs or loppers cut back close to a bud, not so close as to damage the bud, but not leaving a stub which will die back. A sloping cut will allow water to run off. When pruning away diseased wood always cut back to healthy growth.

Large cuts When removing branches with a saw, do not make a stub cut and leave a section of branch that will die back. Likewise, do not make a flush cut level with the main branch or trunk, as this will damage the branch collar. Do not cut through the branch in one go: make a separate cut underneath so the branch doesn't split. Clean up any rough edges with a pruning knife. Do not paint wounds but allow them to heal naturally.

What to do with the prunings

These can make a good wildlife habitat if they are stacked in a pile, particularly larger pieces. However, any diseased wood should be removed and burnt.

Formative pruning

Introduction

Formative pruning is the initial pruning of a young tree to develop a balanced shape. Young growth is pruned back to encourage the tree to grow in the right direction and develop thick branches that will support heavy fruit crops. The aim is to develop a clear trunk and an evenly spaced framework of strong branches that will not shade each other. The amount of pruning required will vary according to the species and

Traditional orchards: a summary

variety of fruit tree. Stone fruits do not respond as well to continuous pruning and should be pruned as little as possible.

Forming a trunk

Trunk formation is important as it allows for livestock grazing. The height of the trunk (ie the point where the first branches start) depends on the type of stock grazing the field: normally between 1.5-2 m is sufficient for sheep and cattle.

Forming the branches

The aim is to have 4-8 secondary leaders which should resemble the spokes of a wheel when viewed from above. These will form the framework from which fruit-bearing side branches will develop. At the required height several secondary leaders that have formed wide, strong angles with the trunk should be selected and the rest removed. The central leader can also be removed or left in place. This is not a regimented process and different styles and shapes of tree have developed around the country.

Maintenance pruning

Introduction

After about 8-10 years of formative pruning the basic shape of the tree should be formed, and the emphasis moves towards fruit production. The aim is to keep the crown open to let in light and air. This is done by removing diseased, damaged and badly positioned branches, and ensuring that the remaining branches do not crowd, shade or rub against each other.

Maintenance pruning helps retain a balance between generating vegetative growth (to produce young wood and rejuvenate the tree) and inducing the formation of fruit buds (to produce good crops). Problems develop when this balance is lost. Without pruning, most buds develop as fruit buds rather than shoots. Conversely, pruning hard makes a shoot or branch grow back more vigorously. Therefore, the general rule is that strongly growing shoots should be left alone, moderately growing shoots should be pruned lightly, and poorly growing shoots should be pruned hard.

Growth forms and fruiting habit (in apple and pear trees)

Apples and pears both form buds along each year's maiden laterals in the base of each leaf. These buds can develop into either fruit buds or growth buds, or remain dormant. In the second year, growth buds form new laterals while fruit buds form spurs that produce flowers and bear fruit. Over time these develop into clusters called spur systems.

Tip v spur-bearers Tip-bearing varieties form fruit buds near the tip of each lateral, while spur-bearers form them at the base. This determines the way the tree is pruned. Most varieties are spur-bearing varieties.

Methods of pruning apple and pear trees

Regulated pruning This is the oldest and most basic way of pruning standard trees. As entire branches are removed, rather than individual laterals or spurs, it is quick and does not require the skills required of the other methods. It is the best way to maintain wildlife benefit, partly because it is a more extensive management technique than other methods of pruning. Most traditional orchards will be pruned this way.

Spur pruning This method was developed to maximise fruit production with each branch considered separately. It is easy to follow but time-consuming and can only be used on spur bearing trees. The tree is shaped to form a framework of permanent branches. Vigorous and upright shoots are removed in favour of horizontal, fruit-bearing laterals and fruit spurs. When these become too big or cease to fruit they are cut out and new shoots, arising from dormant buds, are allowed to replace them.

Renewal pruning This method is a compromise between the above two methods. As with spur pruning, a framework of permanent branches is created. Each branch is considered separately then managed in the way that regulated pruning is applied to the whole tree. Temporary fruiting branches are maintained on permanent branches, but spurs are not encouraged. Most maiden laterals arising from the main branches are not pruned but allowed to develop both fruiting and vegetative growth. Having borne fruit for a few years these laterals are removed in favour of new growth.

Traditional orchards: a summary

Timing of pruning apple and pear trees

Winter pruning tends to promote shoot growth over fruit production, while summer pruning suppresses growth and stimulates fruit production. Standard apple and pear trees are normally pruned during the winter between late October and early April while the tree is dormant. Pruning late in the winter is preferable.

Methods of pruning other types of fruit trees

Stone fruits Pruning of these (plums, damsons, gages and cherries) should be kept to a minimum and confined to summer, as these trees are extremely susceptible to bacterial canker and silver leaf fungus. They should be pruned to form an open-centred tree in a similar manner to regulated pruning. It is usually sufficient to just remove any dead, damaged or poorly placed wood.

Cobnuts These are pruned to form a bush tree with approximately 15 branches about 2 m high. Hard pruning is necessary to maintain this.

Other pruning management techniques

Fruit thinning In a good year a tree can produce a heavy crop. However, the weight of these crops can damage branches, and crowded fruits are often small and disease-prone and ripen poorly. Damaged or misshapen fruitlets can be pinched-out while they are small, as can the central fruitlet in each cluster. This leaves evenly spaced single or double fruits that have sufficient space and light to develop fully.

Bark ringing This is done to reduce the amount of nutrient moving up the tree, thus reducing its growth while still retaining the sugars that help in fruit development. It is done at blossom time and involves removing lateral strips of bark from the trunk. However, this process increases the risk of the tree becoming diseased.

Restoration and management of mature and neglected orchards

Introduction

Traditional orchards that have escaped agricultural 'improvement' are very important within the historic landscape and may support a range of wildlife. To retain their value, the trees and grass sward of traditional orchards require

regular management but, unfortunately, they are often neglected.

Orchard assessment

Before an orchard is restored it should be assessed and, if possible, a management plan written. The assessment should record the condition of the trees and any other features present which, together with the management plan, will allow the management objectives to be set. In most traditional orchards these objectives should be fruit production and the preservation of trees for their cultural, historical, landscape and wildlife benefits. The fruit varieties present should be identified, particularly if they are thought to be rare.

Assessment of individual tree condition

The health of each tree should be considered. The amount of dead and decaying wood, new growth and signs of disease should be recorded, along with the trees' overall size and shape. Old trees are very important for landscape and wildlife and should be preserved for as long as possible.

Causes of poor condition

There are a number of factors that can contribute to the poor health of a tree. These include pests and disease, unsuitable soil conditions, poor nutrition, stock damage, shading and competition, and over- or under-pruning. Often a tree's poor condition may be for several reasons, or caused by a combination of factors. It may be an ongoing problem, or the result of something that happened several years previously. This means it is often difficult to identify the cause of the problem straight away.

Dead and decaying wood

These are not necessarily signs of poor health. Dieback and decay are natural processes that may actually prolong the tree's lifespan and create valuable wildlife habitat. Even dead trees are important for wildlife and should be retained wherever possible.

Restorative pruning

Restorative pruning can help maintain a balanced shape reducing the chances of windthrow. It can also rejuvenate a tree by letting in light and stimulating new growth.

Traditional orchards: a summary

What to remove Diseased wood should be removed first, then poorly placed branches. It is better to make a few large cuts than lots of smaller ones. Any suckers should be removed.

Timing The work should be spread over several years. This puts less stress on the tree and allows time to assess its response. No more than one-third of the wood should be removed in one year.

Fruit tree health

Extensively managed traditional orchards are less likely to suffer from significant pest and disease infestations or nutrient deficiencies than commercial bush orchards. However, problems can still occur.

Weed competition

Competition for water and nutrients can severely affect trees, particularly when young. The area around the base of a new tree should be kept weed free, preferably by mulching. Weeds, particularly brambles and scrub around mature trees, should be cleared if necessary and re-growth controlled by mowing or livestock grazing.

Nutrient status

Nutrient deficiencies These will not usually be a problem in a traditional orchard, particularly if fruit production is not the sole aim. If a deficiency is suspected it can be determined through soil analysis.

Fertilisers Generally these should not be used unless there is an identified need. This is because they reduce the species diversity of grassland and may harm trees in the long run by causing them to abandon their mycorrhizal associations (see below). If used, fertilisers are best applied only around the base of the tree, leaving the bulk of the sward unfertilised. Well-rotted farmyard manure is preferable to inorganic fertilisers as it releases nutrients slowly and increases the soil's organic content. Liming can damage the mycorrhizae/tree relationship and should be avoided.

Fruit trees and mycorrhizae

A tree's root system develops associations with fungi called mycorrhizae. These beneficial fungi

colonise the roots and extend into the surrounding soil, extracting and making nutrients and water available at times of stress as well as acting as natural barriers to root pathogens.

Pests and diseases

Fruit trees may be affected by various pests and diseases which can reduce fruit yield, damage or even kill the tree. Regular inspections of the orchard are important. Most common fruit-tree diseases such as scab, canker, fireblight and silverleaf can be controlled effectively by removing affected branches and leaves at the first signs of infection. All infected material should be removed and burnt. In a traditional orchard most pests will be controlled by predators before they reach unacceptable levels. Creating good site conditions is important: well spaced trees, pruned to allow in air and light, are less likely to suffer from disease and infection. Potential problems can be reduced by planting a mixture of varieties that are adapted to local conditions or are naturally pest and disease resistant.

Chemical use

Traditional orchards, managed without pesticides, provide the richest wildlife habitat. Herbicides, fungicides or insecticides will be detrimental to invertebrates, lichens and fungi and should be used only sparingly, or preferably not at all. Where commercial considerations make pesticides necessary, only appropriate chemicals that are specific to the problem should be applied. This will reduce their impact on non-target invertebrates.

Organic production and biological pest control

Organic control relies mainly on prevention rather than cure. One of the best control methods on young trees is to remove pests and diseased material by hand. However, this can be time consuming. Natural predators such as ladybirds, hoverflies and birds should be encouraged by providing suitable habitats for them. Biological pest controls such as hormone traps can be used to control some pests. Grease bands can be tied round the trunks to prevent moths and other insects climbing up them to over-winter or to feed in the spring.

Traditional orchards: a summary

Orchards and wildlife

Ecologically, traditional orchards resemble mini-parklands or wood pasture due to their combination of open-grown fruit trees, grassland and hedgerow boundaries or scrub. They are an important habitat for a wide range of species: for example, mammals such as dormice, hares and bats; birds such as barn owls, woodpeckers, bullfinches, tree sparrows and thrushes; rare insects such as noble chafer and stag beetle; and plants such as mistletoe, as well as a range of lichens.

Extensive management

Low intensity management without the use of chemicals is the key principal to maximising an orchard's wildlife value. With this approach it should be possible to achieve a reasonable yield of fruit while still preserving habitats.

Orchards in the landscape

As well as conserving individual orchards, it is important to conserve networks of them on a landscape scale. Individual orchards may not be large enough to sustain populations of some of the animals that rely on them, but a network of orchards and other habitats allows populations to move between individual sites.

Orchard trees

The individual trees are the most important wildlife habitat in the orchard. Veteran trees and dead wood, standing or fallen, harbour a wide variety of decayed-wood insects and other invertebrates. They also provide nesting and feeding opportunities for a diverse range of birds. Dead and decaying wood should be retained wherever possible and only removed where it is diseased, unsafe or interferes with necessary operations. Dead trees should be left standing, and large cut branches and fallen dead wood should be retained on site. Most orchard plants and animals depend on the maintenance of a full age-range of orchard trees. New trees may need to be planted, either within the existing orchard or by creating a new one nearby, to ensure this continuity.

Hedgerows

Hedgerows, scrub and non-fruit trees on the boundaries of orchards or within them also add biodiversity value by providing shelter and food

for wildlife. Hedgerows should not be trimmed every year as this will reduce the crop of berries and flowers. When they are trimmed, they should be cut slightly further out each time to avoid cutting into old wood. In the long-term, hedges should be maintained through laying and coppicing in rotation.

The orchard floor

Grasslands in orchards can be rich in wildflowers such as wild daffodil and green winged orchids or, in cobnut plat, woodland plants like primrose and toothwort. Colourful waxcap fungi are also found in orchard grasslands. Bumblebees and other insects nest in areas of longer grass and in patches of bare ground. Sward management should be tailored to the wildlife present but grazing should keep the sward height between 5 and 15 cm. Hay cuts should be late enough to allow wildflowers to set seed, and areas of rough grass in corners and along hedges should be left ungrazed or unmown in rotation to provide wildlife habitats.

Further information

This note is aimed at managers of traditional orchards and agri-environment scheme land management advisers. Other Natural England Technical Information Notes include:

- *Traditional orchards: site and tree selection*
- *Traditional orchards: planting and establishing fruit trees*
- *Traditional orchards: an introduction to pruning*
- *Traditional orchards: formative pruning of young trees*
- *Traditional orchards: maintenance pruning*
- *Traditional orchards: restoration and management of mature and neglected orchards*
- *Traditional orchards: fruit tree health*
- *Traditional orchards: orchards and wildlife*
- *Traditional orchards: glossary*

This leaflet was written by Chris Wedge, Natural England, Burghill Road, Westbury-on-Trym, Bristol, BS10 6NJ, tel: 0117 959 1000.

Natural England Technical Information Notes are available to download from the Natural England website: www.naturalengland.org.uk.

Traditional orchards: a summary

For information on other Natural England publications contact the Natural England Enquiry Service on 0845 600 3078 or e-mail enquiries@naturalengland.org.uk

Useful organisations

Brogdale Horticultural Trust. Home to the National Fruit Collections, Brogdale also offers a postal fruit ID service.
Brogdale Road, Faversham, Kent, ME13 8XZ
Email: info@brogdale.org
www.brogdale.org.uk/

Common Ground. Initiated Apple Day in 1991 and has published a range of useful information.
Gold Hill House, 21 High Street,
Shaftesbury, Dorset, SP7 8JE
Tel: 01747 850820
www.commonground.org.uk/

National Orchard Forum. An umbrella organisation for local orchard groups, has links to many local orchard group sites.
www.nat-orchard-forum.org.uk/

RHS Fruit Group.
South West Secretary
S Harris, Holme Close, Western Road,
Holsworthy, Devon, EX22 6DH
www.rhs.org.uk/

General books

Blackburne-Maze, P. (1986) *The Apple Book* Collingridge Books, Middlesex, England

Common Ground (2000) *The Common Ground Book of Orchards* Common Ground, London

Greenoak, F. (1983) *Forgotten Fruit* Andre Deutsch Ltd, London

Hogg, R. (1884) *The Fruit Manual* (5th ed.) Langford Press, (facsimile, 2002)

Juniper, B.E. & Mabberley, D.J. (2006) *The Story of the Apple* Timber Press Inc.

Morgan, J. & Richards, A. (2002) *The New Book of Apples* Ebury Press, London

Sanders, R. (1989) *The Apple Book* Philosophical Library (Out of Print)

Orchard management books

Baker, H. (1986) *The Fruit Garden Displayed* (new ed.) Cassell Ltd for the Royal Horticultural Society

Baker, H. (1999) *Growing Fruit*, (new ed.) Octopus Publishing Group, London for the Royal Horticultural Society

Hills, L.B. (1976) *Grow Your Own Fruit* Faber and Faber, London
Woodward (1991) *Pruning Hardy Fruits* RHS Wisley handbook, Cassell, London

Fruit identification books

Bultitude, J. (1983) *Apples A Guide to the Identification of International Varieties* Macmillan Press, London (Out of Print)

Clark, M. (2003) *Apples A Field Guide* Whittet Books Ltd, Stowmarket, Suffolk

Copas, L. (2001) *A Somerset Pomona* The Dovecote Press, Wimborne, Dorset

Grub, N.H. (1949) *Cherries* Crosby Lockwood & Son, London

Taylor, H.V. (1946) *The Apples of England*, 3rd ed., Crosby, Lockwood & Son, London

Taylor, H.V. (1949) *The Plums of England*, 1st ed. Crosby, Lockwood & Son, London